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Abstract
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A Modeling Study of the Combustion of Dimethylether Over a Wide Range of Conditions.

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Abstract

Numerical modeling results were compared to experimental results obtained in a jet-stirred reactor (JSR) at 1 and 10 atm, $0.2 \leq \varphi \leq 2.0$, and $800 \leq T \leq 1300$K were modeled, and to those generated in a shock tube at 13 and 40 bar, $\varphi = 1.0$ and $650 \leq T \leq 1300$K. The JSR results are particularly valuable as they include concentration profiles of reactants, intermediates and products pertinent to the oxidation of DME. These data test the kinetic model severely, as it must be able to predict the correct distribution and concentrations of intermediate and final products formed in the oxidation process. Additionally, the shock tube results are very useful, as they were taken at low temperatures and at high pressures, and thus undergo negative temperature coefficient (NTC) behaviour. This reactivity is characteristic of the oxidation of saturated hydrocarbon fuels, (e.g. the primary reference fuels, n-heptane and iso-octane) under similar conditions. The numerical model consists of 78 chemical species and 336 chemical reactions. The thermodynamic properties of unknown species pertaining to DME oxidation were calculated using THERM.

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